

What Do Math Majors Do?

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MAA Drop-in Expo and Informational Fair
on Employment Opportunities for Math Majors
February 7, 2007

The following slides present content from the four career paths as given in the very readable book *Great Jobs for Math Majors* by Stephen Lambert and Ruth DeCotis.



Check it out!

Additional notes are taken directly from the web site of the US Department of Labor (Bureau of Labor and Statistics) and other web sites as noted throughout.

Mathematics Major

FOUR CAREER PATHS

PATH ONE

The math job you know best:

TEACHING

Teachers - Secondary

- Traditional method:
 - Obtain a bachelor's degree in an approved math teacher education program
 - Be licensed
- Nontraditional method:
 - See Dr. Hall

Job Outlook

- Listed as one of the occupations to have the largest numerical increases in employment between 2004 and 2014

US Department of Labor
Bureau of Labor Statistics

Average Salary (2003 – 2004)

- Beginning teachers with a bachelor's degree: \$31,704
- All public elementary and secondary school teachers: \$46,597 (est.)

American Federation of Teachers

- Private school teachers generally earn less but are given other benefits, such as free housing.

Sample Job Advertisement

as listed on www.maa.org/pubs/employ/html

Memphis City Schools

One great teacher can change a student's future forever.

Are you the one?

- Memphis City Schools seeking licensed math teachers for 2007-08. Competitive salary starting at \$37K – \$46K, depending on experience
- Candidates must:
 - Hold a valid teaching license.
 - Have a bachelors degree with a minimum GPA of 2.5
 - Be a U.S. citizen/permanent resident

Applications accepted immediately.

Apply now at <http://www.teachmemphis.org>.

Teachers - Postsecondary

- Graduate Teaching Assistant (GTA)
 - Must be enrolled in a graduate school program
- 2-Year College Faculty
 - Usually consider master's degree holders for full-time positions
- 4-Year College and University Faculty
 - Usually consider doctoral degree holders for full-time, tenure-track positions

Job Outlook

- Listed as one of the occupations to have the largest numerical increases in employment between 2004 and 2014

US Department of Labor
Bureau of Labor Statistics

Salary (2004 – 2005)

Varies according to rank, type of institution, and geographic area

- Average of all full-time faculty: \$68,505
- Average for each level:
 - full professors: \$91,548
 - associate professors: \$65,113
 - assistant professors: \$54,571
 - instructors: \$39,899

Faculty in 4-year institutions earn higher salaries, on average, than do those in 2-year schools.

American Association of American Professors

Sample Job Advertisement

(as listed on www.maa.org/pubs/employ/html)

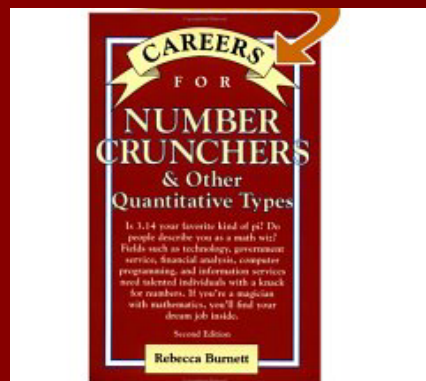
Cabrillo Community College, California

- Mathematics Instructor (Tenure Track position) scheduled to begin Fall semester 2007.
- Starting salary ranges from \$49,081 to \$75,288 per year.
- Announcement and application forms are available on Cabrillo's website:
<http://www.cabrillo.edu/services/hr/apps/index.html>
Application deadline: March 1, 2007.

PATH TWO

Jobs with math as a primary job skill:
(math used daily, math degree is THE critical hiring qualification)

Actuary
Mathematician
Operations Research Analyst
Statistician



*Careers for Number Crunchers &
Other Quantitative Types*

Rebecca Burnett

Actuary

- Helps businesses assess the risk of certain events occurring (death, sickness, injury, disability, or loss of property) and formulate policies that minimize the cost of that risk
- Assemble and analyze data

Essential to the insurance industry
(employs 6 out of 10 actuaries)

Job Outlook

- Employment expected to grow faster than average through 2014
- Stringent qualifying examination system restricts the number of qualified applicants

Salary - Actuary

- Average in May 2004: \$76,340

US Department of Labor
Bureau of Labor Statistics

Sample Job Advertisement

(as listed on www.actuary.com)

Actuarial Assistant *for* GEICO

Compensation with bonus: **mid 40's, varies** - based on exams and experience

**Actuarial Levels Considered: Entry-without exams & Entry-with exams
Student-lower level**

Job Description and Qualifications: GEICO hires graduates with math or related degrees to be trained as actuaries to work in pricing and loss reserving.

- In pricing: collect data from company databases to analyze profitability and recommend rate changes to our current policies.
- In loss reserving: gather and analyze data to help determine how much money the company must hold in reserve to pay for claims which have not yet been settled.

GEICO's Actuarial Department offers a challenging, interesting, well-paying career for individuals with solid math and analytical skills. Candidates with GPA of 3.0 overall / 3.2 in major; excellent written and verbal communication skills; computer skills and leadership potential are preferred.

Mathematician

- **Theoretical**
 - Advances mathematical knowledge
 - Many employed as university faculty
- **Applied**
 - Formulates and solves practical problems in business, government, engineering, and in the physical, life, and social sciences
 - Most efficient airline routes between cities
 - Effects and safety of new drugs
 - Aerodynamic characteristics of an experimental automobile

Employers

(minimum education requirement : Ph.D. degree in mathematics -
except in the federal government)

- **Government** (employs 75% of the mathematicians)
 - <http://www.usajobs.opm.gov/>
 - <http://federalgovernmentjobs.us>
- **Manufacturing** (drug industries are key employers)
- **Private sector** (management and educational services,
research testing, banks)
 - <http://www.math-jobs.com>

Job Outlook

- Master's and Ph.D. degree holders with a strong background in mathematics and a related field (for example, CS or engineering) should have better employment opportunities

Salary - Mathematician

- Average in May 2004: \$81,240

US Department of Labor
Bureau of Labor Statistics

Sample Job Advertisement

(as listed on <http://federalgovernmentjobs.us>)

Mathematician Job in Newport, RI

Department Of The Navy
Naval Sea Systems Command

- SALARY RANGE: 53,000 - 102,685 USD per year
- Job Summary:
 - Openings in submarine weapon systems technology and systems development.
 - Technical areas provide the foundation that enables the conceptualization, research, development, fielding, modernization, and maintenance of submarine systems to include sonar, combat control, electromagnetics, and undersea weaponry and launching devices.
- Basic Requirements:
Completion of a Bachelor's degree or higher in mathematics, or the equivalent of a major that included at least 24 semester hours in mathematics- including differential and integral calculus and four advanced mathematics courses requiring calculus or equivalent mathematics courses as a prerequisite.

Operations Research Analyst

- "operations research" is also referred to as "management science"
- Apply advanced analytical techniques to help make better decisions and solve problems
 - Wartime: deploying radar & searching for enemy submarines
 - Peacetime: determining better ways to coordinate the use of money, materials, equipment, and people in large industries

Job Outlook

- Employers generally prefer applicants with a master's degree in operations research or management science, or a closely related field (CS, engineering, business, **mathematics**, information systems)
- Employment growth is expected to be slower than average BUT good job opportunities in related fields for applicants with higher degrees

Salary – Operations Research Analyst

- Average in May 2004: \$60,190

US Department of Labor
Bureau of Labor Statistics

Sample Job Advertisement

(as listed on <http://federalgovernmentjobs.us>)

Director of the Cost Analysis and Estimating Division (CAED)
Department Of Homeland Security

- Salary Range: 132,437 - 154,600 USD per year
- Major Duties:
 - responsible for all aspects of cost estimating and analysis for DHS programs
 - responsible for identifying fruitful areas of analysis; prioritizing work and allocating resource; directing Independent Cost Estimates (ICEs) for key program decision points (as required); and defining, maintaining and directing the cost analysis core competencies
- Education:
 - bachelor's or higher degree in operations research or equivalent degree which included at least 24 semester hours in a combination of operations research, mathematics, probability, statistics, mathematical logic, science, or subject-matter courses requiring substantial competence in college-level mathematics or statistics.

Statistician

- Apply mathematical principles to the collection, analysis, and presentation of numerical data
- Apply statistical methods to biology, economics, engineering, medicine, public health, psychology, marketing, education, and sports
- Many economic, social, political, and military decisions cannot be made without statistical techniques

Employers

(minimum education requirement : master's degree in statistics or mathematics)

- **Government** (employs 41% of the statisticians)
- **Scientific research and development services**
- **Finance and insurance firms**

Job Outlook

- Favorable job opportunities in a variety of disciplines for individuals with a degree in statistics

Many jobs requiring a degree in statistics will not carry the title "statistician."

Salary - Statistician

- Average in May 2004: \$58,620

US Department of Labor
Bureau of Labor Statistics

- Average starting salary for mathematics/ statistics graduates with a bachelor's degree: \$43,448

National Association of
Colleges and Employers

Sample Job Advertisement

(as listed on www.usajobs.opm.gov)

Mathematical Statistician CDC in Atlanta, GA

The Centers for Disease Control and Prevention (CDC) is the agency American's trust with their lives.

- **SALARY RANGE:** \$77,590 - \$100,869
- **MAJOR DUTIES:** Designs statistical and measurement components of research studies aimed at estimating effects and testing hypotheses related to the Special Pathogens Branch field research as well as laboratory studies aimed at collecting reliability and validity evidence for new diagnostic tests.
- **QUALIFICATIONS REQUIRED:** Applicant must have successfully completed a full 4-year course of study in an accredited college or university leading to a bachelor's or higher degree with a major that included 24 semester hours of mathematics and statistics, of which at least 12 semester hours were in mathematics and 6 semester hours were in statistics.

PATH THREE

Jobs with math as an essential job skill:

(utilizes math skills and allows professional development)
(senior jobs require advanced degrees)

Marketing Analyst
Research Analyst
Financial Analyst

Analysts

- Market and Financial Analysts:
 - Evaluate the marketplace as a whole
 - Study information on shifts in the gross national production, the cost of living, rates of employment, fiscal plans of the federal government, indexes of common stock
- Research Analysts:
 - Collect data in organized forms
 - Assists putting together case studies designed to help the client solve problems or determine future strategies

Salary

- Average in May 2005

Financial Analysts: \$73, 130

US Department of Labor
Bureau of Labor Statistics

Sample Job Advertisement

(as listed on <http://math-jobs.com>)

Associate Quantitative Analyst (Baltimore, Maryland)

- **Primary Purpose of the Position**
Responsible for making a significant contribution to the firm's quantitative research effort by designing, building and maintaining large financial datasets, mathematical models and reporting systems to support and improve the investment process. Also required to establish and maintain good working relationships with the Investment associates.
- **Principal Responsibilities**
 - Design, build and maintain large financial datasets consisting of company, market, economic benchmark and portfolio data.
 - Under the direction of senior level investment staff, develop mathematical models to assist in activities of portfolio managers, analysts, and traders.
- **Qualifications**
 - College degree and four years of related work experience, or a minimum of 6 years related work experience required
 - BA/BS, preferably in statistics, economics, finance, computer science, engineering, mathematics or other quantitatively oriented field, as well as programming and data management skills. Expected future progress towards a MBA/CFA.
 - Excellent communications skills and work well in a team environment

PATH FOUR

Jobs with math as an important job skill:

Retail Buyer and Buyer/Merchandiser Trainee
Sales Service Representative
Purchasing Agent

Handouts

- Please see Dr. Ingram for handouts with information regarding statisticians, actuaries, graduate work, and government jobs.

References

- *Great Jobs for Math Majors* by Stephen Lambert and Ruth J. DeCotis
- Reprints from the *Occupational Outlook Handbook* available in PDF format
<http://www.bls.gov/oco/oco2008.htm>
- Other web sites as noted